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2023

Advanced Manufacturing and Engineering Interviews: Thematic Analysis

DORSET LSIP

INSIGHTFUL RESEARCH TEAM

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Table of Contents

Introduction

This report will outline the findings of the Dorset Local Skills Improvement Plan (LSIP) research in the advanced manufacturing and engineering sector. These findings will provide valuable insight into the current feelings of employers in Dorset and what they desire from education providers. The research methodology used to gather these findings was based on best practices from current literature and is briefly outlined below.

Advanced Manufacturing and Engineering Executive Summary

Employers made their needs very clear, providing actionable insight into ways to support the sector and better prepare students to excel in their careers. The most pressing skill needs currently are transferable skills, an array of engineering skills, machinery use and maintenance, as well as IT and programming skills. It was obvious that skills required within the sector are highly specialised to a particular role or company, therefore it is the transferable and fundamental skills that are most important to employers. It is equally important to acknowledge the future direction of the sector, and employers unanimously agreed that an increased understanding of automation and electronics will be essential.

One of the main challenge the sector faces is the availability of training provision and apprenticeships in Dorset. Unfortunately, at present many businesses feel it is more beneficial to use colleges outside of Dorset. Having said this, employers in Dorset highly value apprenticeships and the blended learning opportunities that colleges can provide. They are therefore eager to engage with education providers for their mutual benefit and have expressed a desire for a higher quantity of courses within Dorset.

We also spoke to employers about the transition to net zero. This is going to be increasingly important for businesses to tackle, and more awareness is needed within the sector. The prominent ideas businesses are looking at are the use of renewable energy and working to improve their supply chains as they feel these are the limiting factors in their progress.

Table 1.

Overview of most frequent interview content

Technical Skills		Non-technical Skills		Business Needs	
Engineering Skills	18	Work ethic	7	Experience	11
Programming Skills	18	Desire to Learn	5	Barriers to apprenticeships	10
Transferable Skills	18	Drive/Motivation	5	Employer - Education Engagement	10
Machine Operation	15	Work Readiness	5	Inability to afford salaries	8
Electronic Skills	13	Aptitude towards working with their hands	4	Attracting more people into businesses	4
IT Skills	11	Interest	4	Engagement with employees	2
Repair and Maintenance Skills	11	Problem solving	3	Increasing demand in the sector	2
Software Skills	11	Spatial Awareness	2	Retain apprentices following completion	2

Cross Sector Methodology

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Firstly, a psychometric survey was created and distributed to employers to assess their satisfaction with employee skill levels. This survey was carefully developed in a 3-stage process of item generation, theoretical analysis, and psychometric analysis. The aims of these stages respectively were to generate items that are clearly understood and relevant, to ensure the items have clear definitions and measure the intended construct, and to test the item's reliability and validity. This resulted in a final survey of 12 questions measuring employee's technical skill level, employee's non-technical skill level and the organisation's preparedness for the transition to net-zero. This survey was distributed by the research team and Dorset Chamber resulting in 386 responses. In follow up to this survey, several employers were invited to participate in a qualitative 1:1 interview. For a survey response or interview to be eligible it had to meet the following criteria: the individual must be responsible in some way for ensuring staff have the skills required, the business must operate within Dorset and it must fit into one of the targeted sectors.
Interview recruitment was challenging, so to supplement the number of interviews and target specific areas that were underrepresented, direct interview recruitment was used in conjunction with leads and partners provided by Dorset Chamber. The interviews were semi-structured, and 17 interviews were conducted from the advanced manufacturing and engineering sector between 06/01/23 and 27/02/23.

The interviews were transcribed and anonymised by the research team increasing familiarity with the data. An inductive 'bottom up' process of thematic analysis was used to identify themes from the interviews and involved two rounds of coding. The first-round organised data into meaningful groups and the quotes from these groups were used to create a code book which was then applied during the second round of coding. Additional codes were added as needed during the second round of coding and the whole process was collaborative and iterative. After the second round of coding was complete, themes were identified by multiple researchers individually, reviewed collaboratively and then finalised.
The following report describes the final themes in detail and provides a clear representation of the views of employers regarding skill deficits, the causes of these deficits, potential solutions and where they are in the transition to net-zero.

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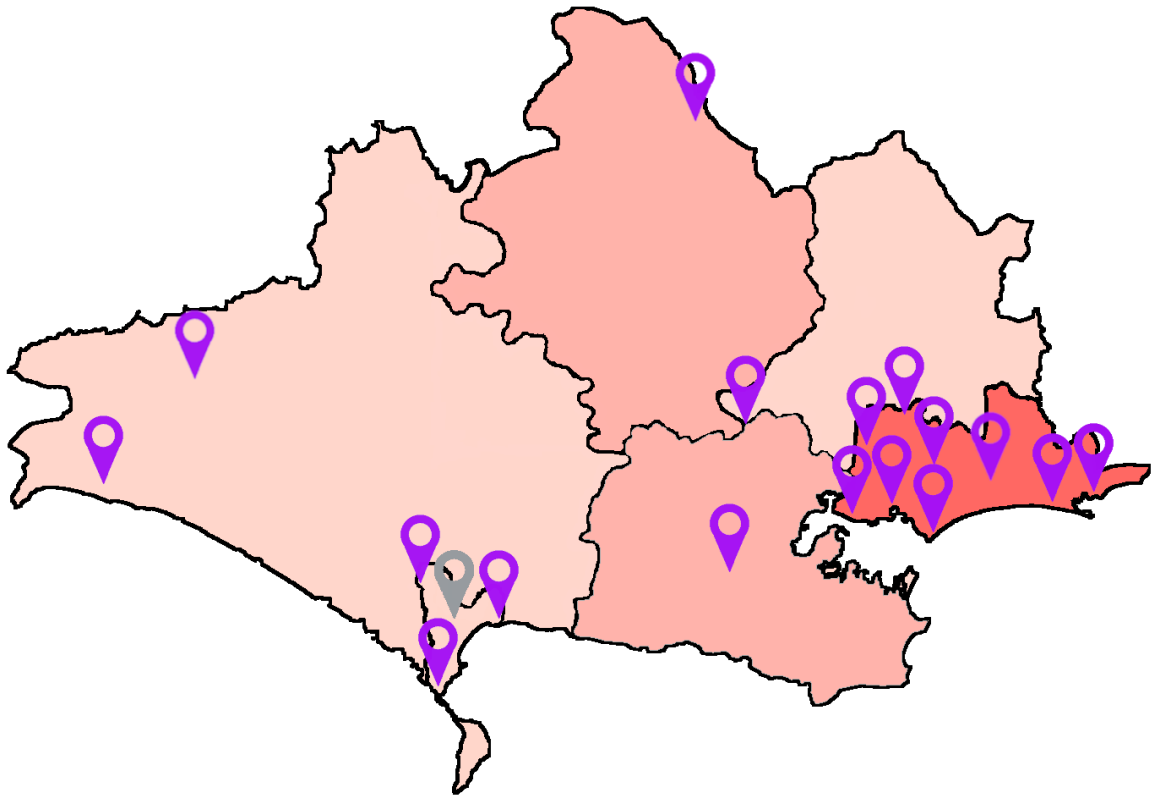

B.C.P	24
North Dorset	8
East Dorset	3
South Dorset	8
West Dorset	5

Survey responses:	**48**
Interview responses:	**17**

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Advanced Manufacturing and Engineering Detailed Interview Analysis

1.0 Skill Needs

This section details the priority and future skill needs expressed by employers throughout the 1-to-1 interviews. Within manufacturing and engineering, technical skills are key. There was a very wide range of technical skills outlined ranging from more generic, foundational skills to very specific skills. Code frequencies for each of the themes outlined were high, with code frequencies of at least 6. This resulted in very clear, overarching themes covering the priority and future skill needs of businesses in the manufacturing and engineering sector.

Code frequency counts across different categories can be found here: https://docs.google.com/spreadsheets/d/1HWZ1uhGuPutxAiZFZpMRMJQjfsTBHUnp9F4GgfTtJrs/edit#gid=0

1.1 Priority Skill Needs

Transferable skills are needed to allow upskilling

Where many of the skills needed within manufacturing and engineering can be very specific to the business and its processes, employers have suggested that fundamental transferable skills are key to allowing businesses to develop more specific skill sets. These transferable skills can relate to hands-on practical skills, taking records, repairing skills, knowledge of products, tools, and materials, and general engineering knowledge.

> Transcript 4 *"The equipment will adapt but these skills will be learnt on site, the college just needs to teach the fundamentals"*

Transcript 10 *"I think the key thing for me in that is the practical skills. if you don't do an off-field apprenticeship and you don't know what a drill is or a maze or a nail or if you've never done any welding, you haven't tried to design something to be welded up, you've never seen one, you don't know how difficult it is to get into certain places. And that's one of the things that we spend a lot of time trying to give to our apprentices and graduates is that sort of manufacturing aspect."*

Transcript 17" *What we've got is we've got some very very clever engineers who can design things on the computer, but they've lost touch of actually what the material feels like and how the material sort of feels and looks and works when it's being worked. So it's just like basic engineering.'*

Engineering Skills and Understanding

There is a general lack of engineering skills and expertise in Dorset. Mechanical, electrical, and software engineers have been specifically mentioned but across the majority of interviews, a general shortage in engineering skills has been noted.

Transcript 2 *"we've worked with a group to try and reduce skill shortages by getting apprentices in etcetera but it is seems to be a massive shortage of qualified engineers to be able to do the task"*

Transcript 3 *"Our main ones are, at the moment we've got a real problem, well many of them but getting engineers. That's a real difficult one to find, from what I understand, that's generally across all areas. Engineers are few and far between... I: What type of engineers would you need for your business though? I: Mainly mechanical"*

Transcript 14 *"The types of people we're looking for are skilled engineers of all types. So whether it's production engineers who are writing the programs, quality engineers who have the relevant experience, guys on the shop floor who have got*

CNC machine experience, you know, really across the board, the engineering skill set is a challenge to find people who want to come and work for us."

IT, programming, and software skills

Employers have outlined a range of IT-related skills needed within the workplace. There is a need for more foundational IT skills in using Word, Excel, and emailing, but by far the most prominent need is in programming. As more machinery becomes automated, there will be a strong importance on having employees with programming and software skills who can modify the equipment to suit the specific needs of businesses. Related to this aspect, will be a need for more electronics engineers to help deal with equipment that is becoming more advanced. These skills will filter into both current and future priority skill needs.

Transcript 1 *"So it's more the focus on really understanding the bridge between the technology and the engineering elements of that, how they would interact with the equipment that we use, the processing equipment that we use, and then be able to help develop that and that's the programming aspect."*

Transcript 5 *"I: And what will the role of the technicians be? P: Well we will need technicians who are capable of organising the automation you see. I: So do they need to program? P: Yes, they would."*

Transcript 14 *"as machines become autonomous, most of them have a robot on the front of them these days. So you don't have an operator loading the machine. But what you will have is a production engineer in the background who would program and get the machine running."*

Transcript 16 *"let's just look at engines for a moment, they're getting much more complex needs, electronics and software to manage them and control them. So it's not a traditional mechanic that can take the head off, or change the pistons or*

whatever or the fuel pump because as much of that, even if they do change the fuel pump, it needs to be electronically set up, software needs to be right, the engine control systems, engines are more complicated."

Maintenance, repair, and operation of machinery

Employers have outlined a need for individuals with skills in being able to operate, maintain and repair machinery, which can often be specific and complex. Furthermore, as the industry transitions into the use of more advanced and automated machinery, there is still importance in having that manual skill set to deal with any issues.

Transcript 1 *"I think it's as if, there's the assumption with modern machinery that nothing will break because everything is computerised now, and there aren't issues, and that's not reflective of the reality. In terms of the maintenance elements for industries, that doesn't really seem to have the focus that I think would be helpful if there were more courses that could develop those technical skills."*

Transcript 3 *"I: What type of engineers would you need for your business though? Like what would they need? P: Mainly mechanical. They will be able to fix and repair, maintain the machinery"*

Transcript 14 *"So it's basic engineering. When you have someone on the shop floor and you're asking them to operate a machine that's probably a million quid worth and they can smash it up by not paying attention and not understanding what they're doing. You've got to have people with a certain level of engineering competence and ability."*

Transcript 14 *"And that's a different skill set because you are now relying on a computer program to do all the the physical movements of the machine makes, but when things don't go to plan before, you call back on your prior knowledge of doing*

it manually to figure out what you've got to change in the program to make that program work"

Manufacturing and production skills and knowledge

Within the industry, employers have outlined a need for more individuals with manufacturing and production skills and understanding. One aspect of this leads back into programming and software development. A further aspect is having people within design to have more skills and experience in understanding the manufacturing side to have a greater appreciation for that side of the work.

Transcript 10 *"And that's one of the things that we spend a lot of time trying to give to our apprentices and graduates is that sort of manufacturing aspect."*

Transcript 14 "We will still need production engineers... as machines become autonomous, most of them have a robot on the front of them these days. So you don't have an operator loading the machine. But what you will have is a production engineer in the background who would program and get the machine running. They would have a good engineering knowledge, be pretty capable, quality control,"

Transcript 15 "This has resulted in seeking skilled production electricians & engineers / GRP boat builders / Tubing technicians all skilled in the marine industry."

Transcript 17 "I: What does that give you, does that give you a better understanding of materials, how they work? Design? P: From what I've seen through my career, it gives you a better problem solving ability because you're not just reliant on a computer program. So you can start thinking about... Thinking outside the box, but you get more of a base to draw upon when you're looking at overcoming sort of manufacturing problems."

Scientific skills and knowledge

Employees value skills and knowledge in science. They need more people with particular scientific skill sets applicable to manufacturing and engineering, but they are also very interested in new employees coming through who have studied science as a foundational skill to build on and develop more in-depth skillsets. This aspect of the skillset could be particularly useful when dealing with the transition to net-zero and adoption of more renewable energy sources.

> Transcript 4 *"Applied science is a college course that would teach good foundational skills A base understanding is required and they find people in the production team often choose to take A level physics after taking on the role"*

> Transcript 5 *"So we can't really recruit someone with a deep knowledge of hydrogen chemistry. So we're going to have to recruit someone with the more generic skills and train them up on the skills specific to us."*

> Transcript 13 "*I think, we'll need to understand high voltage batteries and people that understand hydrogen fuel cells and how to incorporate hydrogen fuel. We'll need people who understand renewable energy, what we can do and how we can evaluate it."*

A difficulty in finding people with good trade skills

Overall, employers have outlined difficulty in being able to find enough trades within the advanced manufacturing and engineering sector industry. For this sector, the most important trades seem to be Welders, Electricians, and Carpenters.

> Transcript 9 *"So we would go and, for instance at the moment we're looking to establish the location where we can get some welding skills and it's a particular type of welding skill - we don't really do much TIG welding here as obviously it's an*

electrical requirements, but obviously those skills are very few and far between, because again it's a dying trend."

Transcript 13 *"It's probably more the trade skills. It's the carpenters, the laminators, the electricians and all those kinds of skills."*

Drive, work ethic, and work readiness

Unlike most other sectors, non-technical skills are not much of a focus within manufacturing and engineering. However, businesses have expressed that there can be a lack of work readiness, and they value employees who show a personal interest in the topic with a desire to learn.

Transcript 7 *"Similarly the other operations we do in the factory, people operate cutting machines and bending machines and it's just being keen to learn and having a bit of a basic aptitude for working with their hands and spatial awareness sort of thing."*

Transcript 4 *"There is a learning curve – apprenticeship "culture shock" Going from school to work"*

Transcript 7 *"Skills aren't so much a problem I'd say. Generally, we're quite fortunate I think. We've got 20-odd people on the payroll and they're all pretty good, the only thing is it's just finding people that are keen to work hard"*

1.2 Future Skill Needs

A shift toward automation

During the interviews, there was a significant theme of automation. Employers expect this to be huge within manufacturing and engineering, and there will be a need for more skills

to be able to run automated machinery. These skills will feed back into programming and software skills noted in the previous section, and will be extremely important going forward for the industry,

> Transcript 1 *"Yeah, but again a lot of it now, with the new technology, and the IT interfaces we can use, it's really more about automating the systems and adjusting the different machinery that we use for manufacturing to different types of products so we can run different lines using the same machinery. So it's being able to adapt those and being trained to be able to adapt those and to ensure that the quality of the finished products is unaffected."*

> Transcript 5 *"We expect our manufacturing to be very automated, it will be highly automated."*

> Transcript 13 *"Think in the future I think could be some automisation skills and skills in programming like for automation and people who can program robots and things like that, it's quite a sought after skill."*

> Transcript 3 *"I think with the potential automation, the improvement in the machinery and equipment and the plant equipment that we have, if it becomes more automated or there's more electronic input or whatever it may be into it and you probably still along those those IT skills and that side of things."*

Production operatives and technicians are going to need more flexible skillsets

Employers have outlined the expectation that in the future, production operatives and technicians will require more flexible, rounded skillsets to deal with a larger range of tasks. Again, these tasks will revolve around skills in programming and understanding more advanced machinery.

Transcript 1 "Would that be a more senior role though? It is sort of senior, but in terms of process automation, the standard operatives they are involved with that process as well."

Transcript 3 *"I: What do you see the future needs of your business being in 2, 5 and even 10 years time? P: Good question I think they probably will be again increasing demand on on what mainly our operatives might be doing"*

Transcript 5 *"And what will the role of the technicians be? P: Well we will need technicians who are capable of organising the automation you see. I: So do they need to program? P: Yes they would, and there would be different levels of it. It wouldn't be like a traditional factory work of the generation, but it would be people who were at home with software"*

Modern technology use and electronic skills are going to become more important

Along with automation, manufacturing, and engineering businesses are going to need skills in being able to adapt to more advanced modern technology use. There will be skills needed to operate and maintain these modern machines.

Transcript 1 *"Now, I think if courses are more reflective of the new technology that is being introduced in industry and into manufacturing courses, so more a combination of engineering and IT focus"*

Transcript 3 "So that would be IT skills worked alongside increasing automation and new better machines? Yeah, exactly updated and more modern machinery, we are quite modern machinery but yeah those developments in the coming years than expected to increase and improve."

> Transcript 5 *"Well, yes. If they've got interests in things like building drones, or playing around with any sort of programming, any sort of geeky thing if you like, playing around with models and radio controlled models. All that helps. Electronics."*

> Transcript 16 *"I'd call it systems and electronics. So electronics, we definitely struggle to get good electronics engineers."*

2.0 Employer Perspectives on Challenges and Causes of Skills Deficits

Within this section, detailed are the expressed challenges towards upskilling that employers have faced, and these are areas employers have perceived as potential causes for the skills deficits they are facing.

2.1 Challenges and Causes

Under-resourced college courses

An area of concern is that, from the experience of employers, there is the feeling that many of the college courses for manufacturing and engineering roles can be under-resourced to adequately teach students. Furthermore, there were comments suggesting that businesses have had better experiences by sending their employees to colleges in areas outside of Dorset such as Southampton.

> Transcript 2 *"the students wasted a good six months of their first year not having tutors, not having facilities, not having tools to be able to progress. And then the first thing about these issues, we're not doing this next year, we're out somewhere else."*

Transcript 10 *"He's been to [redacted] college because [redacted] college had some trouble where they didn't have enough tutors to deliver the course."*

Transcript 14 *"that's been our experience with apprenticeships, with the service providers in the area... The tutors leave, service providers either stops that particular type of training all together and it just makes it a challenge for businesses to manage."*

Not enough local training provision or specific courses

Employers have outlined concerns that there is not enough local training provision in Dorset to allow them to upskill their employees, and that there are not enough specific courses to develop the skills that they are in particular need of. Again, employers have had to send employees to provision outside of Dorset, which has a negative impact due to commute.

Transcript 9 *"The closest we could find was actually the [redacted] College that we tried originally five years ago but they stopped doing the course. So we weren't able to resource that and we had to go to a private provider in Southampton to get that specific skill."*

Transcript 2 *"Training wise, we're adding an hour and a half travel each day onto the students. And if they're coming out of college/school and wanted to learn, they don't necessarily drive. So it's a longer commute, it's a big challenge"*

Transcript 1 *"So, I think that causes an issue with us. I think the focus on the colleges is more to go with more generic types of courses"*

Transcript 12 *"Because it's a hard one to go into engineering and actually have a qualification that's really of any interest to us"*

Barriers to apprenticeships

Employers have outlined that they have faced significant barriers in being able to offer apprenticeships and that there are concerns about the lack of apprenticeships in the industry. Specifically, smaller companies can lack resources to offer apprenticeships with lower staffing numbers and costs, while other businesses have experienced difficulties with the college side.

> Transcript 2 *"It's very difficult for us to accept work experience because we are short staffed ourselves once you know, once you get, even when they're on apprenticeships, they've still got to be, they can't let loose, so they still gonna be shadowed, they have to shadow a person."*

> Transcript 17 *"Well, no, because we've never run it for the younger people, well, you need to remember something, that's a considerable amount of money that we have to invest to run that sort of course. It has to be right for the business at the end of the day."*

> Transcript 14 *"We've dropped out of having apprentices for the last three calendars basically. I mean, we have an apprentice who should have finished his apprenticeship about a year ago, and the colleges just made such a mess of it"*

> Transcript 1 *"When I think back to when I was leaving school and the options I had available to me, there were apprenticeships that were very focussed with local businesses, and there was more of a clear pathway for school leavers to go and start from age 16"*

General labour shortage and inability to find skilled staff

Like other sectors' findings, the manufacturing and engineering sector has faced difficulties in being able to recruit staff due to general labour shortages. Specifically, it can be very difficult to find and recruit skilled and trained engineers, technicians, and tradespeople.

Transcript 2 *"we've worked with a group to try and reduce skill shortages by getting apprentices in etcetera but it is seems to be a massive shortage of qualified engineers to be able to do the task"*

Transcript 8 *"Oh of course, when I say labour what I was more referring to is more, you know, there is good engineers out there but there's not enough of them? P: Yes, agreed"*

Transcript 12 *"say I need another technician… well, I've got no chance - they're just not there."*

Transcript 15 *"Our issue has been to find reliable and skilled workers seeking employment without using specialist recruitment agencies which come with specialist fees."*

Challenging competition

A challenge that employers have expressed is the difficulties related to competition. Employers can often find it difficult to compete with large salaries, limiting level of skills brought into the business, and there are difficulties in having to compete with other sectors when it comes to bringing in employees with specific skills. Particularly, businesses have expressed that where programming and software skills are and will be majorly important, people with those skills are more interested in digital tech. Thus there will be a need for more people who are interested in engineering to have those IT-related skills. Similarly, there is the feeling that mechanical engineers would rather work elsewhere.

Transcript 6 *"And we do need software people, but they would much rather go and work for a gaming company to come and work for us so somebody with an engineering background or an interest in manufacturing or metals."*

Transcript 12 *"And you say there's no chance filling those technician roles? We struggle, we struggle. Any technician in the county, if they haven't got a job they're looking for then there's gonna be a very good reason for that because any technician at the moment can probably pull into any other dealers yard and get a job straight away, literally.... They'd just get employed just like that."*

Transcript 8 *"What we've found now is that everybody needs people and therefore the price and the salary and the rates are going up and so it becomes very competitive in terms of trying to secure these people."*

Transcript 9 *"The next set of skills, obviously we're talking about with mechanical skills. So when you look at people that do motor mechanics, that kind of thing, they tend to go for jobs that are specific for most mechanics."*

Skills needed are extremely business specific

Employers expressed that they are sympathetic that most skills that they need can be very specific to their business. Skills in using different machinery, different production lines, and different equipment, may be very specific to the needs of one particular business, and this is seen to be a significant challenge to bridging the skill deficit.

Transcript 9 *"So when it comes to finding people for this role or given for the training, what like what training options do you go down? We don't really have any training options that are specific to our industry as it's quite niche."*

Transcript 10 *"The rest of ours are in engineering and design that are more specific, and I think that we are quite unique in that way in that we're looking for skills in engineering and design that are not particularly what everyone else is looking for."*

Transcript 7 *"Okay great so it sounds like ... are the machines that you have there fairly specialist so you have to be trained on site as such? Person 2: Uhh they're not*

specialist in that they're highly technical but they are specialist in the way that if we put out an advert it's unlikely that someone is going to come back and say oh yeah I've operated these machine before"

3.0 Employers' Perspectives on Preferred Solutions to Skill Deficits

Within the proposed solutions, there are different ends of the spectrum to what businesses feel that they need to help deliver the skillsets they are missing. Some have outlined that they feel confident about their abilities to develop specific skills in-house, while some would be more confident if there were more specific college courses available to develop skills. This section has detailed both sides of the spectrum.

3.1 Solutions

Apprenticeships are highly valued for developing skillsets

As with other sectors, apprenticeships are important. They are key to being able to develop the hands-on technical skillset and the theoretical knowledge. Where some employers see a lack of hands-on experience being given to employees within education, apprenticeships can provide an answer to this.

Transcript 3 *"What do you think works well about having the apprentices, what is it about the scheme? The fact that they are the best of both of us, so they can learn on the job, obviously learn a theory and that the best way to doing things at the college, they get a bit more rounded development because I have to do the theory, the exams, assessments, those sorts of things and if you like the classroom-based stuff."*

Transcript 12 *"I: Okay, what are the courses you need? P: A full engineering apprenticeship."*

> Transcript 14 *"And is that basic engineering grounding that gets you through. and some people learn on the job, but they've never, they never quite as good as those who have gone through an engineer apprenticeship and have the training."*

In-house training is valuable for developing extremely specific skills

Employers see value in being able to take someone on who has the core foundational and transferable skills needed in manufacturing or engineering and training them up in-house to suit their specific needs. A lot of employers understand that their business may be very specific, and require extremely specific skill sets, so appreciate that it could be difficult to run very specific college courses. However, many feel that it would be possible to focus the specific training in-house if there are more people coming through with foundational, transferable skills in manufacturing and engineering.

> Transcript 7 *"I: It sounds like a lot the skills that you need in house are non-transferable in the sense that you have to develop them there and then. P: Yeah but they're quite quick to develop so yeah"*

> *Transcript 9 "So that's what I mean, like a skill set to try and get them to fit in that group, I'd have to take a fairly rounded engineer, mechanical engineer or car mechanic and retrain him."*

> Transcript 12 *"I mean the ones the ones that my technician obviously product specific; guys who have got experience with these particular machines, so no one's gonna be able to offer that with the manufacturer to the level that we required because we also got to bear in mind that being a dealer, you know, we have to put these guys through training as part of what our manufacturers expect."*

> Transcript 4 *"The equipment will adapt but these skills will be learnt on site, the college just needs to teach the fundamentals"*

A need for more specific college courses

Some employers have outlined that they need more specific college courses to develop the skills in manufacturing and engineering that they need. The courses need to be more reflective of the industry in Dorset rather than being more generic courses.

> Transcript 1 *"one of the problems I find with Dorset, and I suppose having lived in a different part of the country I can compare better, there isn't really the focus on industry the same as in other parts of the country. So I think in terms of the demographics, and also where we are as well, there's not the sort of same level of concentration of large industry areas in Dorset. So, I think that causes an issue with us. I think the focus on the colleges is more to go with more generic types of courses"*

> Transcript 4 *"Specific course at college – HNDs, HNCs"*

> Transcript 17 *"Now, for college courses and those sorts of courses to actually reflect what businesses want, the link between business and education has to be a lot closer"*

More local training provision

Employers have expressed a desire for there to be more local training courses available. Where the lack of local training courses has been found to be a challenge for businesses, there is a need to solve this.

> Transcript 12 *"From an apprenticeship point of view, you know, I say these courses that they do are, I mean it's not unusual for people to be travelling halfway up the country or halfway down, you know, because there are quite limited on the places that do these courses."*

Transcript 10 *"So you'll go there for like two or three weeks at a time, and then come back for a couple of months maybe, and then he'll go back up again. Why are they travelling so far? Because there's no way around here that does the engineering courses that we require really."*

Transcript 2 *"There needs to be either something on the site here, there could be a potential to set up a training site"*

The desire for engagement with education providers

Employers have outlined a desire for more engagement with education providers. Employers feel that this could be beneficial on both sides and would increase the level of skills and learners coming into the manufacturing and engineering industry. Currently, some businesses feel that engagement with the education sector is poor, but there is a desire to improve this.

Transcript 1*"I'm not really seeing any type of engagement with employers particularly in our type of industry from colleges where they would sort of say... what sort of partnership work could we do, what courses could we consider using that would be beneficial, and could deliver skills that would complement the different types of industries and broaden that experience and skillset for college leavers"*

Transcript 17 *"So I think what's missing from a big sort of perspective, is the link between education and business as a whole. I support a local school as an enterprise advisor and I find that the education system is in its own little bubble, it doesn't understand what's happening in business and it doesn't understand business"*

Transcript 2 *"The training, some of it is there, it's not local we tried to set up something with the [redacted provider] to get the apprenticeship scheme working*

with them and it all went horribly wrong. So, our apprentices currently have to travel to [redacted provider] to be able to get the training they need"

Hands-on practical skills development

Employers have outlined a need for more practical skills development in college and training courses. They feel that there is a general lack of focus on this in the current courses and that where transferable, hands-on skills are needed, practical skills development would be good for developing those.

Transcript 10 *"I think the practical side of engineering is kind of missing now. There are a lot of really good academic, bright people, but they wouldn't necessarily know one bolt from the other."*

Transcript 14 *"But the practical side of the training I think is, I don't know whether it's underfunded or what I've been out of it for a couple of years now, but it seems to be a struggle and I think that the college struggles to employ people who want to do that job and stay in it."*

Transcript 12 *"But the majority of the training they go to [provider name] on the New Holland products and we would put them on specific training courses for certain machines. So that's how we tend to do it."*

4.0 Net Zero Findings

This section details findings related to understanding, issues, and solutions to the transition to net-zero. Within the manufacturing and engineering sector, there has seemed to be more of an understanding among employers, allowing for the generation of recurring themes.

Supply chain reliance

A challenge, and a potential solution, facing businesses is the reliance on the supply chain in terms of purchasing materials for use. Businesses have stressed that they would require supply chains to be more sustainable, and this would be beneficial in helping them move towards net zero.

> Transcript 10 *"I think the next step will be... to think where are we going to get it made, what machines are they using, where do they get their products. If I have a piece of steel that is hard to get a hold of but the suppliers are getting it from Australia then that becomes more challenging."*

> Transcript 7 *"They might change the way they make concrete, there will obviously be a push towards how they do that, but that is outside the scope of my organisation I guess."*

> Transcript 17 *"And that's slowly being sort of combined into normal business practice and that's and that's how I'm treating our net zero. We buy 60 tonnes of tube a week, our tubes come from Germany, so shipping from Germany, that's because nobody in UK buys it. But it's actually made in a blast furnace that uses electric electricity rather than coke, which is 75% less polluting."*

Importance of energy consumption and renewable energy

To meet the transition to net-zero, reducing energy consumption and using more renewable energy sources are going to be important. In terms of developing skills for the transition to net-zero, employers have expressed a need to have employees who understand and have skills in energy consumption and renewable energy.

> Transcript 13 "*I think some of the things we need are especially on energy management. We need somebody who can understand energy and energy consumption and options like that, we'll need somebody who can understand and*

evaluate different renewable options. So, we're looking at solar of course but there are other renewable options."

Transcript 3 *"So yeah our MD are very much that way focused and trying to be as green as energy efficient and self sufficient as possible and aware of this sustainability the impact on the environment."*

A need for more awareness and understanding of net-zero

Where some companies have expressed a lack of knowledge on the subject, there will be a need for more business-side awareness of what needs to be done and how they can efficiently tackle the transition to net-zero.

Transcript 3 *"It may just be increasing the understanding or again the knowledge of what other options are available to either increase or improve on that, but we do have to start, the foundation if you like, of going down that route"*

Transcript 17 *"But from a skills point of view, I think teaching awareness"*

5.0 Business Needs and Recruitment Focusses

This section details recurring themes around specific needs and recruitment focuses of businesses that are not distinctly related to skill needs or solutions to skill deficits

5.1 Business Needs

A need to attract more people into the industry

A slight area of focus has been the need to attract more people into the manufacturing and engineering industry. Some have highlighted that it should be possible to market the industry in a more attractive way, while others would like more secondary school focus and awareness on manufacturing and engineering.

Transcript 14 *"Us as business, we could be doing to attract people, we're not very good at working on and stuff like that. So yeah, so have our part to play in that."*

Transcript 5 *"We probably need to be a bit smarter in terms of how we market the industry. How many can see pictures here of factories in sheet, metal rollers and heavy industry, but actually it's an amazing industry to get into. I'm off to South Africa this weekend and I've travelled the world of the back of this industry, and I would love to be able to tell that story to some of the younger people so we can bring those skills in house because is very very competitive market"*

Transcript 1 *"But really, what I would find would benefit us, and again this is more with the sort of t-levels and apprenticeships, it's a case of being able to give that option early in the secondary school education for those who can be steered towards that path and the options that are available to them when they're considering their options in year 8, year 9, to have that awareness and be able to decide that that might be a helpful path to them."*

Transcript 4 (Speaking to apprenticeship provider) *"They have the hope that they could get people in young for internships and apprenticeships for them to then go to university and come back to the business"*

5.2 Recruitment Focuses

Formal qualifications and experience are necessary when recruiting

When it comes to recruitment, businesses place high value on candidates who have relevant formal qualifications, and those who have gained experience in carrying out this role. These aspects may be unsurprising, but with the general lack of local provision noted within this sector, this could be seen to be a concern. Some of the general courses preferred by employers in this sector, however, revolved around science.

Transcript 1 *"Really it's a case of, one of the sort of things we would look to identify when recruiting staff the qualifications that they studied for. We're looking for people during secondary education that were leaning towards the more science related subjects and leaning towards the IT subjects as well."*

Transcript 4 (speaking to apprenticeship provider) *"Applied science is a college course that would teach good foundational skills A base understanding is required and they find people in the production team often choose to take A level physics after taking on the role"*

Transcript 6 *"So we need people who have five GCSEs ideally who can come onto the apprenticeship and then they can progress from there"*

Transcript 8 *"Well yes, I mean we don't typically tend to hire them because of the nature of our business. We do in some areas, but what we're particularly looking for is people with specific experience"*

5.3 Employers value personal interest

Despite the focus on formal qualifications and experience, some business outlined their value on employees having clear personal interests and hobbies related to roles. Having that personal interest is seen to be beneficial when it comes to upskilling, as it can provide a drive and willingness to learn.

Transcript 4 (Speaking to apprenticeship provider) *"They would consider taking on someone who is a good hobbyist – has a practical mindset and some practical ability eg. Good at servicing their bike etc"*

Transcript 5 *"Well, yes. If they've got interests in things like building drones, or playing around with any sort of programming, playing around with models and*

> *radio controlled models. All that helps. Electronics. Hobbies with electronics and technical things is a very good background, and a lot of people do get into those things."*

> Transcript 9 *"So that's why we're so glad we got the chap we have now because he has an interest in cars and he's going to be like the next generation of turbocharger engineers."*

Conclusion

Overall, the themes that emerged from the qualitative interviews portray a clear picture of the needs, challenges and desires of the Advanced Manufacturing and Engineering sector.

Firstly, it is clear that a top priority going forward should be the development of college courses within Dorset. There is a direct mutual benefit between employers, education providers and students if this can be done while proactively engaging with Dorset businesses.

Secondly, based on the skill needs within the sector, the underlying focus of these courses should be on transferable skills and hands-on, practical application of these skills. It was found that a lot of the skills businesses require are highly specific to the role and company, and due to this, businesses find a lot of benefit in the use of in-house training to develop these skills. Having said this, employers did highlight current skill gaps in engineering, manufacturing, machinery operation and maintenance, and in scientific areas. It is important to directly address these skill gaps while ensuring what students are learning can be applied to highly specific situations when they enter the workforce.

Additionally, the future skills that employers are going to need should be incorporated into the curriculum early. This will allow the sector to be proactive rather than reactive as the industry develops. Continued engagement between businesses and education will enable this. The future skill needs that employers highlighted revolve around increasing automation and incorporation of electronics and technology into both products and processes.

Another pressing issue faced by the industry is the labour shortage which has been a consistent finding across several sectors. To combat this, employers want to encourage more young people into the industry. Although this is likely to be something that needs to be done in early education, having high quality courses and apprenticeships available locally is likely to increase the interest of local school leavers.

Finally, the sector generally appears to be in the early stages of the transition to net zero and the awareness of the subject area could be improved. Having said this, some companies have clearly put some thought into the transition to net zero. The key areas companies want to address is their energy efficiency and implementation of renewable energy as well as the sustainability credentials of their supply chain.